

## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: January 27, 1983  
SUBJECT: New Bedford Risk Assessment  
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TO: Debbie Dalton, WH 527

Site:	<u>New Bedford</u>
Break:	<u>5.10</u>
Other:	<u>46536</u>

Attached is the risk assessment for New Bedford Harbor, per your request.

I. Site: New Bedford Harbor

II. Extent of the Hazard to Public Health, Welfare or the Environment.

A. Population at Risk.

There are multiple pathways of PCB and heavy metal exposure from the harbor and upland sites to the general public, including: direct contact; ingestion of contaminated fish; surface water uses; ambient air; infants feeding on contaminated breast milk; and, possibly, via contaminated groundwater.

All segments of the population are potentially exposed, and, therefore, at risk.

B. Amount and Forms of the Substances Present.

There are an estimated 500,000 pounds of PCBs in the New Bedford Landfill and an unknown amount in adjacent Sullivan's Ledge (a historic industrial dumping site).

In the Aerovox mudflats the sediment contains as much as 190,000ppm (19% by weight) of PCB. Several miles of the river have average sediment concentrations of PCBs greater than 50ppm and are, therefore, classified as hazardous waste.

The New Bedford Sewage Treatment Plant discharges an estimated 500-700 pounds of PCBs per year directly into Buzzards Bay through their outfall and unknown amounts through 27 combined sewer overflows. In one segment of the river, heavy metals (copper, zinc and chromium) constitute over 1% of the dry weight of the sediments. This would represent tens of thousands of pounds of toxic metals in the river bottom.

Polychlorinated Dibenzofurns may be present in, as yet, unknown quantities. The two possible sources are: 1) as a contaminant of commercial PCB mixtures; and, 2) through the incomplete combustion of PCBs at the New Bedford Sewage Treatment Plant Sludge Incinerator.

C. Hazardous Properties of the Substances.

PCBs are highly persistent compounds which accumulate in the food chain. They are acutely and chronically toxic to aquatic organisms. PCBs are also toxic to humans; they are possible carcinogens, display co-carcinogenic properties and have been implicated as human teratogens. Other human health effects attributable to PCB are eye and dentition abnormalities, fatigue and chloracne.

Polychlorinated Dibenzofurans (PCDFs) have been identified in commercial PCB mixtures. PCDFs are a hundred to thousands of times more toxic than PCBs. Severe health effects, including deaths, at the Japanese Yusho incident may be attributable to the presence of PCDF in PCBs.

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Heavy metals, including copper, chromium, and zinc are toxic to aquatic organisms. EPA has established Water Quality Criteria for these metals due to their toxicity. Elevated metal levels have been found in the tissues of aquatic organisms in the harbor and bay.

#### D. Hydrogeological Factors.

The upland disposal sites are adjacent to wetland areas and in close proximity, and upgradient to, the Town of Dartmouth's drinking water wells. Therefore, there is a potential impact on the Town's potable water supply.

The contaminated sediments in the harbor are in a hydraulically dynamic system resulting in the transport of PCB to Buzzard's Bay, a productive commercial fishery. PCBs are in direct contact with overlying water resulting, in some cases, in levels in the water column exceeding the EPA Water Quality Criterion for PCBs. The elevated sediment and water PCB levels result in contamination of commercial fishes to levels above the FDA limit of 5ppm.

#### E. Climate.

The major climatic features affecting exposure and hazard to the populace are wind and temperature. High summer temperatures increase the volatilization rate of PCBs. The prevailing winds carry contaminated air directly to residential neighborhoods and commercial areas. Ambient air PCB levels in Fairhaven and Acushnet ranged from three times to twenty times higher than background (upwind) sites.

### III. Extent of Migration.

PCBs contaminate at least six linear miles of the estuary, and has resulted in fishing bans on over 18,000 acres of the harbor. The Aerovox and Cornell Dubilier plant yards are highly contaminated with PCBs. Many upland locations used as dredge disposal sites are contaminated with unknown levels of PCBs and heavy metals. The 40 acre landfill contains one-half million pounds of PCB.

The movement of PCBs from the harbor are slowed by natural forces and from a man-made hurricane barrier. However, PCBs do move into the bay through the barrier opening contaminating ever increasing areas of Buzzards Bay.

### IV. Prior Experience.

While there have been cases of PCB contamination in other areas of the country (Commencement Bay, Waukegan Harbor, and Hudson River) this situation is unique in that it involves at least two upland disposal sites, a contaminated city sewer system with 27 combined sewer overflows and a sewage sludge incinerator (the sludge is also contaminated with PCBs and heavy metals), and a large super-hot spot of sediments contaminated with PCB ranging from 1,000 to 190,000ppm.

Some approaches and management tools developed from previous experiences will be useful. For example, sediment transport models, sampling protocols, community relations techniques, cost/benefit analysis methodologies and, possibly, treatment technologies may be transferrable to this project.

#### V. Environmental Effects and Welfare Concerns.

The level of PCBs in the area residents' blood (based on a nonrandom survey) were higher than 99% of the United States population, according to CDC statistics. There is intense public interest and fear about potential health effects.

Over 18,000 acres of productive fishing areas have been closed due to PCB contamination. The closings have adverse impacts on the fishing industry as a whole, and in particular the lobstermen.

Economic development of harbor facilities in the Towns of New Bedford and Fairhaven have been severely impacted because maintenance and developmental dredging cannot occur until a hazardous waste disposal site is found for the dredge spoils.

#### VI. Remedial Investigation (R.I.) Assessment.

The RI/FS for New Bedford will likely take 15 to 24 months to complete and approach \$2 million. Work elements will include:

- 1) Ambient Air Sampling
- 2) Hydrogeological investigations at upland sites
- 3) Sediment, water, and biota sampling
- 4) Investigations of undisclosed sources/sites
- 5) Sediment transport/food chain model
- 6) Data management system
- 7) Wastewater system investigations
- 8) Investigate disposal sites and permitting requirements.

#### VII. Analysis of Alternatives.

In 1980, the Massachusetts Department of Environmental Quality Engineering (DEQE) hired Malcolm Pirnie, Inc., to develop estimates of the cost of removing PCB-contaminated sediments from New Bedford harbor by means of dredge and fill techniques being studied for the Hudson River. Using only data already available, Pirnie estimated that removal of 90% of the PCBs would cost \$130 million. Pirnie has recently revised its estimates on the basis of some, but not all, of the new data now available. Pirnie's estimates are summarized in Table 1 below. It may be that in spite of the high cost, dredging of some amount of sediment will ultimately be found to be the only acceptable alternative. However, Region I does not consider the Pirnie study to be an adequate substitute for a thorough feasibility study which would assess the alternatives to dredging. The estimated cost of a feasibility study for New Bedford Harbor is approximately \$2 million, and the time required is approximately two years.

The proposed litigation would be aimed at obtaining funding of the feasibility study by the responsible parties as a first stage of relief. The feasibility study will analyze alternatives and costs in a way not presently possible.

If negotiated settlement fails, Region I proposes to ask the District Court for partial summary judgment on the issue of the responsible parties' liabilities for the cost of the feasibility study, with jurisdiction to be retained until completion of the study, when decisions can be made on further relief.

## CONCEPTUAL DREDGING PROGRAMS

(1981 Dollars)

<u>Alternative</u>	<u>Dredged Material Volumes, Cu.Yds.</u>			<u>Cost \$ Millions</u>
	<u>Remedial Program</u>	<u>Harbor Development Program</u>		
1. Dredging and secure containment containing PCB concentration >500 ug/g (Hot Spots I)	70,000	-		5-10
2. Dredge and secure containment of sediments containing PCB concentration >50 ug/g (Hot Spots II)	2,200,000	-		60-70
3. Dredging and containment of sediment with PCB concentration >10 ug/g. Sediment containing PCB concentration equal to 50 ug/g or greater will be contained at a secure upland site. Sediments containing PCB concentrations <50 ug/g will be handled in shoreline disposal areas. (Hot Spots III)	4,400,000	-		110
4. Initiation of Small Scale Harbor Development (Harbor Development Project C)	-	300,000		15
5. Initiation of Large Scale Harbor Development (Harbor Development Project D)	-	900,000		25

Notes:

Initiation of harbor development projects refers to removal of 3 ft. of harbor muds at sites to be developed.

Small-scale harbor development includes channel improvement dredging, bridge excavation and 35 acres of new harbor development area.

Large-scale harbor development includes channel improvement dredging, bridge excavation and 170 acres of new harbor development area.

Remedial dredging program costs are based on assumptions listed in Section 4 and represent only order of magnitude estimates.

From: Malcolm Pirnie, "Acushnet River Estuary PCB Study. Draft Final Report", September 15, 1982.